Result Page

Invention relates to air conditioner, with which a duct can be in an air conditioning housing into a first air duct, by which through interior air flows, and into a second air duct, by which through outside air flows, divided.

With a conventional air conditioner in accordance with disclosure in JP-A-5-124 426 are an interior air intake connection for the insertion of interior air and an outside air intake connection for the insertion of outside air to a END and/or. Face of its air conditioning housing formed, and are a floor space air outlet to bubbles of air in the direction of the floor area of a passenger in a passenger compartment, an Defroster air outlet to bubbles of air in the direction of the inner surface of a windshield and a head room air discharge opening to bubbles of air in the direction of the head portion of the passenger into the passenger compartment to the other END and/or. Face of the air conditioning housing formed.

In the air conditioning housing a partition plate is to the splitting of the interior of the air conditioning housing into a first air duct, that itself from the outside air outlet to the head room air discharge opening and the floor space air outlet extended, and in a second air duct provided, that itself from the outside air intake connection to the Defroster air outlet extended.

The other are both into first and in the second air duct cool purposes serving heat exchangers, heating purposes of serving heat exchangers, a bypass passage, which go around the heating purposes serving heat exchanger in the bypass, and an air mixing flap a provided. If one of the modes of head space mode, Bi-level-mode and floor space mode becomes a selected as air discharge opening mode, if interior air/outside air introduction mode is set to the interior air rolling over mode of operation, interior air becomes introduced, while then, into the two air ducts, if the mode is set to the outside air introduction mode, the outside air becomes introduced into both air ducts.

▲ top The other, if those becomes floor space/Defroster mode as the air discharge opening mode selected, an interior air/an outside air alternating current mode becomes set, with which the interior air into the first air duct introduced will and which becomes outside air into the second air duct introduced. In this way becomes, because the passenger compartment in paths of a rotating guidance of the interior air, which already heated is, heated and/or. heated is improved, the heating power. The other it, because the outside air, which exhibits a small humidity, becomes blown toward to the windshield, is possible, in secured manner a Defrostung and/or. To reach snow and ice removal of the windshield.

However there are the subsequent problems as sequence of examinations and examinations of the air conditioner, which for experimental purposes manufactured is, due to condensed water cool purposes of the serving heat exchanger. That is, to the reduction of the size of the air conditioning unit heating purposes serving heat exchangers are in the vicinity cool purposes of the serving heat exchanger disposed, in order to train between these a small distance. Therefore in that serving heat exchanger of generated condensed waters easy heat exchangers serving at that heating purposes adheres to cool purposes. In this way will the humidity in the passenger compartment increased, and becomes the Defrostung of the windshield reduced. Since a partition plate is to the splitting first and the second air duct between that cool purposes serving heat exchanger and that heating purposes serving heat exchanger disposed, the condensed water of the other easy at that adheres to heating purposes serving heat exchangers along the partition plate.

In the case of a vehicle, with which in the engine the generated heat is too small, in order to warm up the cooling water with the engine in sufficient manner, for example in the case of a vehicle with a diesel engine or with a low-performance engine, on the other hand, because on a predetermined temperature it will not maintain the temperature of the cooling water in the cooling water circle can the problem arises that the heating ability for the passenger compartment is insufficient.

In view on those indicated problems is managing it a first object of the invention to create an air conditioner for a vehicle which can prevent that condensed water at that adheres to heating purposes serving heat exchanger.

It is a second object of the invention to create an air conditioner for a vehicle those prevented that the heating ability for the passenger compartment is insufficient, as an auxiliary heater unit becomes used.

It is a third object of the invention to be created an air conditioner for a vehicle some the pre-determined temperature difference between air, which becomes from a first air duct from blown, by which through interior air flows, and air adjust can, which is blown out by a second air duct, by which through outside air flows, using an auxiliary heating source with interior air/outside air alternating current mode adjust can.

It is fourth object of the invention to create an air conditioner for a vehicle which can increase the temperature of the air, which becomes from any duct of first air duct and second air duct from blown in prefered manner.

It is a fifth object of the invention to create an air conditioner for a vehicle the one suitable temperature difference between air, which becomes from a side of a hot water inlet heating purposes of the serving heat exchanger from blown, and air to adjust can, which becomes from a side of a hot water discharge opening of the same out blown.

In accordance with a first aspect of the invention the partition plate possesses a first end, which are connected with that cool purposes serving heat exchanger, and a second end, which are connected with that heating purposes serving heat exchanger, and is the partition plate between that cool purposes serving heat exchangers and that heating purposes serving heat exchanger such a oblique disposed with an air conditioner that the first end of the partition plate at the lower side of the second end of the partition plate is disposed. Therefore moved itself at the partition plate of adherent condensed waters to the side cool purposes of serving heat exchanger along the inclined partition plate, in order to prevent in such a way that itself the condensed water to the side heating purposes of the serving heat exchanger moved. In this way prevented can become that the humidity in the passenger compartment becomes increased and that defrosting the windshield by condensed waters affected adherent at that heating purposes serving heat exchangers and/or. degraded becomes.

In prefered manner is heating purposes serving heat exchangers the heat exchanger such a oblique disposed serving opposite the refrigerant that the bottom end heating purposes of the serving heat exchanger of that is cool purposes serving heat exchanger in the comparison with the upper end heating purposes of the serving heat exchanger separate. With the air conditioner an Defroster opening portion at that is immediate air-downstream side of the upper end heating purposes of the serving heat exchanger disposed, and is the upper end heating purposes of the serving heat exchanger generally at that immediate air-downstream side heating purposes of the serving heat exchanger disposed. In this case it can because the bottom end heating purposes of the serving heat exchanger is oblique disposed, so that it is of that cool purposes serving heat exchanger separate, in order to exhibit a large distance between that cool purposes serving heat exchanger and the bottom end heating purposes of the serving heat exchanger, prevented becomes that in that generated condensed water direct heat exchanger serving at that heating purposes clings to cool purposes serving heat exchanger on, if air flows.

In still large prefered manner the first end of the partition plate possesses one V-shaped surface with a central region and two ends in the width direction first and the second air duct, and is higher the central region of the surface as the two ends in the width direction. Therefore moved itself to the side cool purposes of serving heat exchanger along the inclined partition plate of moved condensed waters easy to the two ends of the V-shaped surface along the V-shaped surface. Thus prevented can become that to the side cool purposes of the serving heat exchanger of moved condensed waters back-flows, if air flows.

▲ top

Still large prefered possesses the first end of the partition plate a guide member for leading the condensed water downward, and possesses the guide member a variety from holes to the Heruntertropfenlassen of the condensed water. Therefore to the side cool purposes of the serving heat exchanger moved condensed waters smooth drips downward.

In accordance with a second aspect of the invention an auxiliary heater unit at the air-downstream side heating purposes of the serving heat exchanger is disposed with an air conditioner, which can adjust an alternating current mode, with interior air a first air duct flows through and outside air flows through a second air duct. Therefore can even if the temperature that heating purposes serving heat exchanger of the supplied hot water is low, which heating abilities for the passenger compartment and the Defrosten of the windshield are improved using the auxiliary heater unit.

In prefered manner heating purposes serving heat exchangers are so disposed that it crosses both first and the second air duct, and are the auxiliary heater unit so disposed that them cross both first and the second air duct, in order air, which pass through first and the second air duct, to warm up. Therefore can a pre-determined temperature difference between air, which becomes from the first air duct from blown, and air, which becomes from the second air duct from blown, easy and simple set become, as the arrangement position in the auxiliary heater unit becomes changed opposite the first air duct and the second air duct.

In other prefered manner heating purposes serving heat exchangers are so disposed that it crosses both first and the second air duct, and are the auxiliary heater unit in the first air duct disposed, in order to warm up air, which passes through the first air duct. Therefore the temperature of the air, which becomes from the first air duct from blown, becomes in prefered manner increased.

In other prefered manner heating purposes serving heat exchangers are so disposed that it crosses both first and the second air duct, and are the auxiliary heater unit in the second air duct disposed, in order to warm up air, which passes through the second air duct. Therefore the temperature of the air, which becomes from the second air duct from blown, becomes in prefered manner increased.

In accordance with a third aspect of the invention a variety from tubes to connecting first and the second container with the air conditioner heating purposes exhibits serving heat exchangers a first container with a hot water inlet, a second container with a hot water outlet and. Heating purposes serving heat exchangers is such with a current in a single direction, with the hot water of the first container by each tube in a single direction to the second container flows, and the heater unit is at the air-downstream side heating purposes of the serving heat exchanger at a location in the vicinity of the first container with the hot water inlet disposed. Alternate one is the auxiliary heater unit at the air-downstream side heating purposes of the serving heat exchanger at a location in the vicinity of the second container with the hot water outlet disposed. Thus can a suitable temperature difference between air, which becomes from the side of the hot water inlet heating purposes of the serving heat exchanger from blown, and air set become, which becomes from the side of the hot water outlet of the same out blown.

Other objects and advantages of the invention are to be seen from the subsequent description of detail of preferable embodiments with common consideration with the accompanying designs easy, in which show:

Fig. 1 a schematic illustration of the entire building method of the ventilation system of the air conditioner in accordance with a first preferable embodiment of the invention;

Fig. 2 a schematic illustration partly in the section of the ventilation system of the air conditioner of a second preferable embodiment of the invention;

Fig. 3 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a third preferable embodiment of the invention;

Fig. 4 a perspective view from the direction of arrow A in Fig. 3 with the illustration of a bent area connected with a partition plate;

Fig. 5 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a fourth preferable embodiment of the invention;

Fig. 6 a partial section from the direction of arrow B in Fig. 5;

Fig. 7 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a fifth preferable embodiment of the invention;

Fig. 8 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a sixth preferable embodiment of the invention;

Fig. 9 a front view of an heater core of the air conditioner of the sixth embodiment;

top

Fig. 10 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a sieved preferable embodiment of the invention;

Fig. 11 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a respected preferable embodiment of the invention; and

Fig. 12 a schematic illustration of the entire building method of the ventilation system of the air conditioner of a ninth preferable embodiment of the invention.

Subsequent ones become preferable embodiments of the invention bottom reference on the designs described.

First the first preferable embodiment of the invention bottom reference on Fig becomes. 1 described.

An air conditioner of this embodiment can find with a vehicle application, with which in an engine the generated heat is too small, in order to warm up the cooling water with the engine in sufficient manner, for example with a vehicle with a diesel engine.

The air conditioner possesses a fan unit 1 and an air conditioning unit 100. The air conditioning unit 100 is a bottom dashboard in a passenger compartment at that about central region in the direction of the vehicle from right to the left and/or. of on the left of to the right disposed. On the other hand is in accordance with illustration in Fig. 1 the fan unit 1 at the vehicle front of the air conditioning unit 100 in row disposed. That is, the air conditioning unit 100 is in a passenger compartment disposed, and the fan unit 1 is in an engine compartment at the front side of the air conditioning unit 100 disposed. However the fan unit 1 of the air conditioning unit 100 in the passenger compartment in the direction of the vehicle from left can to the right and/or. of on the right of to the left shifted its.

First the fan unit becomes 100 subsequent described. The fan unit 100 is with first and a second interior air inlet connection 2 and/or. 2a to the insertion of interior air (D. h. of air in the passenger compartment) and with an outside air introduction connection 3 to the insertion of outside air (D. h. of air outside of the passenger compartment) provided. Interior air and outside air introduction connections 2, 2a and 3 become closed by means of first and a second interior air/outside air switching flap 4 and 5 opened and.

For example first and second interior air/outside air switching flap 4 and 5 become in each case around rotary shafts 4a and ä rotated and are operatingtechnical with a manual actuator of an air conditioning actuation board (not shown) over a connecting lever mechanism connected. With the first embodiment the interior air inlet connections 2 and 2a become, the outside air introduction connection 3 and interior air/outside air switching flaps 4 and 5 using the manual actuator manually operated.

Within the fan unit 1 a first fan (interiorair lateral) is 6 and a second fan (outside air lateral) 7 to bubbles of air the disposed, which becomes of the air inlet connections 2, 2a and 3 from introduced. Both first and the second fan 6 and/or. 7 is a multi-shovel centrifugal fan (D. h. Chirocco fans), and both become concurrent 7 in circulation offset by means of a single common electric motor.

Fig. 1 shows the state of an interior air/an outside air alternating current mode (those other down described becomes). In this case, because interior air/outside air switching flap 4 opens the first interior air inlet connection 2 and locks the outer-air duct 3a of the outside air introduction connection 3, interior air becomes 6 sucked into an intake connection 6a of the first fan. Because second interior air/outside air switching flap 5 locks the second interior air inlet connection 2a and opens the outer-air duct 3b of the outside air introduction connection 3, on the other hand the outside air becomes 7 sucked into an intake connection 7a of the second fan. Therefore the first fan 6 interior air of the interior air inlet connection blows 2 out into a first air duct 8, and blows the second fan 7 outside air of the outside air introduction connection 3 out into a second air duct 9 with interior air/outside air alternating current mode. The first air duct 8 and the second air duct 9 are 10 from each other separate by means of a partition plate, which is 7 disposed between the first fan 6 and the second fan. The partition plate 10 knows integral with a spiral housing part 10a, which is manufactured from plastic, to the receptacle both first and the second fan 6 and/or. 7 formed its.

With the first embodiment the external diameter of the first fan is a 6 small as that of the second fan 7, in order to prevent in such a way that the opening area of the intake connection 7a of the second fan 7 becomes 7 reduced by planning the electric motor 7b at a side of the second fan.

The air conditioning unit 100 is such, with both the evaporator (D. h. cool purposes of serving heat exchangers) 12 and an heater core (D. h. heating purposes of serving heat exchangers) 13 integral in an air conditioning housing 11 received are. The air conditioning housing 11 is from plastic manufactured, which exhibits an elasticity in a certain extent and in its strength is superior to which, for example polypropylene, and the housing 11 consists of an upper and a lower partial housing ever with a division-flat in vertical direction (D. h. in the direction vehicle from above downward and/or. from bottom to top) in Fig. 1. The partial housings become integral by mounting means, for example by means of a Metallfederklips and a screw, integral connected with one another, after the evaporator 12, the heater core 13 and components are as for example a flap (like subsequent still described becomes) there received, in order to form the air conditioning unit 100.

▲ top

At the furthest in front convenient side of the air conditioning housing 11 the evaporator is 12 in such a manner disposed that it crosses the whole areas first and the second air duct 80 and 90. In known manner the evaporator serves 12 for the cool one of the conditioned air, whereby latent heat of vaporization of a refrigerant of a cooling agent circle becomes from the conditioned air absorbed. In accordance with illustration in Fig. 1 is the evaporator 12 in the direction of the vehicle from in front to the rear and/or. from in the back forward thin.

A climatic channel, that, is of the luftstromaufwärtigen side of the evaporator 12 to the air-downstream side of the heater core 13 extended divided by partition plates 15a, 15b and 15c into the first air duct 80 at the lower side of the vehicle and into the second air duct 90 at the upper side of the vehicle. The partition plates 15a-15c are integral with the air conditioning housing 11 using plastic formed and are a stationary partition element, itself for instance in horizontal direction in the direction of the vehicle from left to the right and/or. of on the right of to the left extended. However the partition plates 15a, 15b and 15c can be also by the air conditioning housing 11 separate formed. In this case the partition plates can be 15a, 15b and 15c at the air conditioning housing 11 using an adhesive or mounting means, as for example by screws, mounted.

The partition plate 15b disposed between the evaporator 12 and the heater core 13 is in such manner inclined that the end of the partition plate 15b, which is 12 connected with the evaporator, at which lower side is; and the other end of the partition plate 15b, which is 13 connected with the heater core, is at an upper side. With the first embodiment is in accordance with illustration in Fig. 1 end (subsequent as the "bottom end" referred) of the partition plate 15b with the evaporator 12 at the center of the evaporator in the direction from above downward and/or. down upward connected, and is the other end (subsequent than the "upper end" referred) of the partition plate 15b with the heater core 13 at the center of the heater core 13 downward in the direction from above and/or. from downside upward connected. A drainage terminal 11a to the discharge of condensed water generated by means of the evaporator 12 is in the air conditioning housing 11 at a bottom portion of the floor of the evaporator 12 provided.

Evaporators 12 is laminated evaporators, is laminated with which a variety of flat tubes, whose everyone is formed by

mutual connecting of two thin metal plates, manufactured from aluminium or such a thing, in order to arrange a corrugated fin between adjacent flat tubes sand yield-like, and then integral soldered is. In the evaporator 12 is an air duct formed. The air duct in the evaporator 12 is so divided on the extension lines of the partition plates 15a and 15b by means of a ribbed surface of the corrugated fin or a flat surface of the flat tube that the first air duct 80 and the second air duct are 90 in the evaporator 12 likewise from each other separate.

At the air-downstream side (D. h. at the vehicle back) of the evaporator 12 the heater core is 13 adjacent disposed, in order to train a pre-determined small distance (for example 20-30 mm) between them. The heater core 13 serves cool air, which passed through the evaporator 12 for the rewarming up. In the heater core 13 high temperature cooling water (hot water) flows to the cool one of the engine of the vehicle, and the heater core 13 heated air using the cooling water as heat source.

In same way as the evaporator 12 is the heater core 13 in the direction of the vehicle from in front to the rear and/or. from in the back forward thin and in the air conditioning housing 11 disposed. The heater core 13 is in such a manner disposed between the partition plates 15b and 15c that it both first and the second air duct 80 and/or. 90 crosses and is to the upper side of the vehicle related to the evaporator 12 shifted. That is, in the direction of the vehicle from above downward and/or. the heater core is 13 in such a manner disposed from downside upward that it crosses the total area of the second air duct 90 and crosses a part of the first air duct 80, in order to train a cooling air bypass passage 17 in the first air duct 80 at the lower side of the heater core 13. Heater core 13 is laminated heater core, is laminated with which a variety of flat tubes, whose everyone is formed by mutual connecting of two thin metal plates, manufactured from aluminium or such a thing, in order to arrange a corrugated fin between adjacent flat tubes sand yield-like, and then integral soldered is. In the heater core 13 is an air duct formed. The air duct in the heater core 13 is so divided on the extension lines of the partition plates 15b and 15c by means of a ribbed surface of the corrugated fin or a flat surface of the flat tube that the first air duct 80 and the second air duct are 90 in the heater core 13 likewise from each other separate.

The heater core 13 possesses a first container 13a, which is in the first air duct 80 disposed, a second container 13b, which are in the second air duct 90 disposed, and an heater core 13c between the first container 13a and the second container 13b. A hot water inlet is in the first container 13a provided, and a hot water outlet is in the second container 13b provided. In the heater core 13 hot water, which becomes of the first container 13a from introduced, flows by the flat tubes of the core region 13c from the lower side toward to the upper side of the same, and flows in the hot water into the second container 13b. That is, with the first embodiment the heater core 13 is such with a current in a single direction.

A hot water valve 14 for adjusting the flow amount or the temperature of the hot water, which flows in into the heater core 13, is provided, and the temperature of the air, which is to be injected into the passenger compartment, becomes 14 set by means of the hot water valve. That is, with the embodiment the hot water valve 14 is a temperature setting unit for adjusting the temperature of the air, which is to be injected into the passenger compartment.

In the first air duct 80 within the air conditioning housing 11 the cooling air bypass passage is 17 formed, by through the air at the lower side of the heater core 13 (D. h. cool air) flows, whereby it goes around the heater core 13 in the bypass, and the cooling air bypass passage 17 is opened by means of a maximum cooling flap 18 only with the kind of maximum

top air conditioning.

At the upper area of the air conditioning housing 11 an Defroster opening portion is 19, which stands with the second air duct 90 direct in connection, opened at that immediate air-downstream side of the heater core 13. The Defroster opening portion 19 becomes closed by means of a Doppelflügel Defroster flap 20 opened and, which is by means of a rotary shaft 20a rotatably supported. The Defroster opening portion 19 serves for bubbles of conditioned air toward to the inner surface of the windshield of the vehicle by a Defroster duct or through an Defroster air outlet.

At an area of the furthest backwards convenient side of the vehicle (D. h. at the side of the passenger) the head space opening portion is 21, which stands with the first air duct 90 direct in connection, opened. The head space opening portion 21 becomes closed by means of a head space flap 22 opened and, and the head space flap 22 is in double wing shape formed and by means of a rotary shaft 22a rotatably supported. The head space opening portion 22 serves for bubbles of conditioned air in the direction of the upper side of a passenger in the passenger compartment from a head room air discharge opening, which is provided at the upper side of the dashboard, by a head space channel (not shown) through.

Between at the furthest air flow downward convenient side end the partition plate 15c and the inlet region of the head space opening portion 21 is a communication path 23 to the production of a connection between first and the second air duct 80 and/or. 90 provided. The communication path 23 becomes closed by means of a connecting flap 24 opened and, which is by means of a rotary shaft 24a rotatably supported.

In the bottom surface of the air conditioning housing 11 a floor space opening portion is 25 opened at a location of the rear vehicle side, which stands with the first air duct 80 direct in connection. The floor space opening portion 25 becomes closed by means of a floor space flap 26 opened and, and the floor space flap 26 is in a double wing shape formed and by means of a rotary shaft 26a rotatably supported. The floor space opening portion 25 serves for bubbles warm air in the direction of the floor area of the passenger in the passenger compartment from a floor space air outlet by a floor space duct through.

The Defroster flap 20, the head space flap 22 and the floor space flap 26 are connected with a manual actuator (not

shown) of an air discharge opening mode of operation switch unit of the air conditioning actuation board over a connecting lever mechanism, in order to stop the air discharge opening mode of operation, and become mutual connected manually operated. However the flaps 20, 22 and 26 can become also by means of an actuator member, for example a servomotor, mutual connected operated.

The hot water valve 14 and the maximum cooling flap 18 are connected with a connecting lever mechanism (not shown) and become by means of an actuator, for example by means of a servomotor, a corresponding temperature rule signal of the air conditioner mutual connected operated. Alternate ones are the hot water valve 14 and the maximum cooling flap 18 with a manual actuator of the temperature adjusting unit of the air conditioning actuation board over a connecting lever mechanism connected, and become them mutual connected manually operated.

Next the operation of the first embodiment with the above-described construction bottom reference becomes described on each of the air discharge opening modes.

(1) Floor space Luftauslass-mode

If the maximum heating mode becomes at present the beginning of a heating procedure in the winter set, will interior air/outside air switching means operated, in order to adjust interior air/outside air alternating current mode. In this case first interior air/outside air switching flap 4 opens the first interior air inlet connection 2, and locks it the outer-air duct 3a opposite the outside air introduction connection 3. The other second interior air/outside air switching flap 5 locks the second interior air inlet connection 2a, and opens it the outer-air duct 3b opposite the outside air introduction connection 3. Therefore the first fan 6 interior air, which becomes of the first interior air inlet connection 2 from introduced, sucks in by the intake connection through 6a, and sucks in the concurrent second fan 7 outside air, which becomes of the outside air introduction connection 3 from introduced, by the intake connection through 7a. Interior air, which becomes of the first fan 6 from blown, passes through the first air duct 8 and flows in into the first air duct 80 in the air conditioning housing 90. The other outside air, which becomes of the second fan 7 from blown, passes through the second air duct 9 and flows in into the second air duct 90 in the air conditioning unit 100.

On the other hand the air discharge opening mode of operation switching means become so operated that the floor space flap 26 opens the floor space opening portion 25, locks the head space flap 22 the head space opening portion 21 and the Defroster flap 20 19 something opens the Defroster opening portion. Even with the alternating current mode will the connecting flap 24 operated, in order to open the communication path 23 complete or to open around the communication path 23 with a small opening degree something.

The other, because the maximum heating mode is set, the hot water valve is 14 fully opened. In this case the maximum quantity of the hot water flows in into the heater core 13, and locks the maximum cooling flap 18 the cooling air bypass passage 17. Interior air, which becomes 6 blown by means of the first fan, flows through the first air duct 80 of the air conditioning unit 100, and outside air, which becomes 7 blown by means of the second fan, flows through the second air duct 90 of the air conditioning unit 100. Therefore after passes through the evaporator 12 in the first air duct 80 interior air in the heater core 13 and the floor space opening portion 25 heated to warm air through toward to the floor area of a passenger in the passenger compartment blown out. Concurrent one after passes through the evaporator 12 in the second air duct 90 the outside air in the heater core 13 and the Defroster opening portion 19 heated to warm air through toward to the inner surface of the windshield blown out. Because in the circulation led interior air (D. h. Air within the passenger compartment) with a temperature of high as the outside air in the heater core 13 heated will, becomes the temperature of the air high which can be injected into the floor area of the passenger compartment. Because on the other hand outside air (D. h. Air outside of the passenger compartment) with a low humidity in the heater core 13 heated and toward to the windshield blown is defrosted, can the windshield in satisfactory manner and/or. clear made becomes. In this way it is possible to guarantee both the improvement of the heating effect for the passenger compartment and the improvement of defrosting the windshield.

top

With the floor space Luftauslass-mode the warm air of the outside air in the second air duct 90 is through interfered into the warm air of interior air in the second air duct 80 by the communication path 23, so that the ratio of the amount (about 20%) from the Defroster opening portion of the 19 can become from blown air and the amount (about 80%) from the floor space opening portion 25 from blown air in prefered manner of the set.

Next, if the temperature of the passenger compartment rises and the heating load drops, the hot water valve becomes 14 from the full open position (D. h. from the maximum heating state) to a middle open position operated, in order to regulate the temperature of the air injected into the passenger compartment, and becomes the amount of the hot water reduced inflowing into the heater core 13. This time the connecting flap becomes 24 held in the set position, with which the communication path is 17 fully opened or somewhat opened, and locks the maximum cooling flap 18 the cooling air bypass passage 17.

In the middle temperature range of control the maximum heating ability for the passenger compartment is not necessary. Therefore interior air/outside air introduction mode will adjust generally to the mode for exclusive outside air, with both first and the second interior air inlet connection 2 and/or. 2a sealed are and both first and the second outer-air duct 3a and/or. 3b of the outside air introduction connection 3 opened are. However the mode for exclusive interior air set can become, with both first and the second outer-air duct 3a and/or by a manual operation on the part of the passenger. 3b of the outside air introduction connection 3 sealed are and both first and the second interior air inlet connection 2 and/or. 2a

opened are, or can the interior air/outside air alternating current mode set become, with which interior air and the outside air become concurrent as described above introduced.

(2) Floor space/Defroster air outletmode

With the floor space/Defroster air outletmode will to adjusting the amount of the those from the Defroster opening portion 19 about same of the floor space opening portion 25 from air which can be blown (ever 50%) the floor space flap 26 operated, in order the floor space opening portion 25 complete will open, and the Defroster flap 20 operated, in order to open the Defroster opening portion 19 complete. The other will the connecting flap 24 operated, in order to lock the communication path 23 complete. Therefore entire interior air flows in in the first air duct 90 into the floor space opening portion 25, and flows in the entire outside air in the second air duct 90 into the Defroster opening portion 19. Thus it is possible to adjust the amount from the floor space opening portion of the 25 from blown air of about same those of the Defroster opening portion 19.

With the maximum heating mode, is 14 fully opened with which the hot water valve, will in same way as with the floor space Luftauslass-mode interior air/outside air alternating current mode set, in order to ensure an improvement both to the heating effect for the passenger compartment and defrosting the windshield.

The other, after the opening degree of the hot water valve 14 on a middle opening degree set is, in order to switch the maximum heating condition to the middle temperature expensive range, generally the mode for exclusive outside air becomes set. However the mode for exclusive outside air or interior air/outside air alternating current mode can become set by a manual operation on the part of the passenger in the passenger compartment.

In the heater core 13 of the first embodiment hot water in a single direction of a side of the first air duct 80 to the second air duct 90 flows, and becomes the temperature of the hot water at the side of the hot water outlet low as that at the side of the hot water inlet. Therefore the floor space/Defroster air outletmode the temperature becomes lower toward air blown to the Defroster opening portion 19 as that toward air blown to the floor space opening portion 25 with the above-described floor space Luftauslass-mode and. Thus the temperature distribution for the "heating of the floor space range and the cool of the head space range" can become in the passenger compartment achieved with the mode of the suction of exclusive outside air.

(3) Defroster air outletmode

With the Defroster air outletmode the head space flap 22 locks the head space opening portion 21 complete, and locks the floor space flap 26 the floor space opening portion 25 complete. The other the Defroster flap 20 opens the Defroster opening portion 19 complete, and opens the connecting flap 24 the communication path 23 complete. Therefore will the entire air of the first air duct 80 and the second air duct 90 toward to the inner surface of the windshield blown, in order to defrost these. Concurrent one will the mode for the suction exclusive of outside air set, in order to ensure a defrosting of top the windshield.

(4) Head room air discharge opening mode

With the head room air discharge opening mode the head space flap 22 opens the head space opening portion 21 complete, locks the Defroster flap 20 the Defroster opening portion 19 complete, and locks the floor space flap 26 the floor space opening portion 25 complete. The other the connecting flap 24 opens the communication path 23 complete. Therefore both the first air duct 80 and the second air duct 90 exclusive with the head space opening portion 21 stand in connection.

Corresponding one is then blown out cool air, which in the evaporator 12 cooled is, by means of the heater core 13 again heated, so that the temperature of the air becomes regulated, and the entire conditioned air in the direction of the head space opening portion 21. To this time any mode of mode for exclusive interior air, mode for exclusive outside air and alternating current mode can by means of first and second interior air/outside air switching flap 4 and/or. 5 selected become.

With the kind of maximum air conditioning (D. h. the maximum cooling state) the mode for exclusive interior air becomes set. The other the hot water valve closes 14 complete, in order to interrupt a circulation of the hot water into the heater core 13 inside, and opens the maximum cooling flap 18 the cooling air bypass passage 17 complete. Therefore will the amount of the cool air enlarged which can be injected into the passenger compartment, and can the cool ability for the passenger compartment maximized become.

(5) Bi-level-air outlet-mode

With the Bi-level-air outlet-mode the head space flap 22 opens the head space opening portion 21 complete, and opens

the floor space flap 26 the floor space opening portion 25 complete. The Defroster flap 20 locks the Defroster opening portion 19 complete, and the connecting flap 24 opens the communication path 23 complete. Therefore the air concurrent can become toward both the upper side and the lower side of the passenger compartment by the head space opening portion 21 and the floor space opening portion 25 through blown.

In the heater core 13 of the first embodiment hot water exclusive in a direction of a side of the first air duct 80 flows to a side of the second air duct 90, and becomes the temperature of the hot water at the side of the hot water outlet low as that at the side of the hot water inlet the same. Therefore even then, if the mode for exclusive outside air or the mode for exclusive interior air is set, the temperature of the air, which passes through the second air duct 90, becomes low as that the air, which passes through the first air duct 80. That is, the temperature of the air, which becomes 21 blown toward to the head space opening portion, becomes low as that the air, which becomes 25 blown toward to the floor space opening portion. With the Bi-level-air outlet-mode thus the temperature distribution for the "heating of the floor space range and the cool of the head space range" can become in the passenger compartment achieved.

If the cooling cycle of the air conditioner in operation taken will, in order to defrost the passenger compartment to cool or around the windshield, will water vapor, which is contained in air, at the evaporator 12 condensed, and can an adhesion at the heater core 13 take place. That is, in a case, is 13 so disposed with which the partition plate 15b between the evaporator 12 and the heater core that the upper end of the partition plate 15b at the evaporated side is and the bottom end of the partition plate 15b at the heating core side is or the partition plate 15b horizontal between the evaporator 12 is and the heater core 13 disposed, becomes condensed water, which adheres to 15b at the partition plate, easy and quick toward to the heater core 13 discharged, if air flows. However the partition plate 15b between the evaporator 12 and the heater core is 13 in such a manner inclined with the first embodiment that the bottom end of the partition plate with the evaporator is 12 connected and the upper end of the partition plate 15b with the heater core is 13 connected. Therefore even then, if the condensed water at the partition plate adheres to 15b, prevented can become that the condensed water itself to the side of the heater core 13 along the partition plate 15b moved.

Thus prevented can become with the first embodiment, because the condensed water hardly adheres to 13c of the heater core 13 at the heating range, that the humidity in the passenger compartment rises and defrosting and/or. Clear-made degraded becomes.

Subsequent one becomes a second preferable embodiment of the invention bottom reference on Fig. 2 described. The construction of the air conditioner 100A of the second embodiment is same those the air conditioner 100 of the first embodiment. With the second embodiment the heater core is 13 12 disposed oblique opposite the evaporator. The other areas of the air conditioner 100A are the same as those the air conditioner 100 of the first embodiment.

That is, with the first embodiment the evaporator 12 and the heater core are 13 parallel to each other in the direction of the vehicle from above downward and/or. from downside upward disposed. With the second embodiment is however in accordance with illustration in Fig. 2 the heater core 13 opposite the evaporator 12 inclined, so that the distance between the bottom end of the heater core 13 and the evaporator 12 large as the distance between the upper ends of the heater core 13 and the evaporator 12 in the direction of the vehicle from in front to the rear and/or. becomes from the rear forward.

▲ top

With the second embodiment the Defroster opening portion 19 at that is immediate air-downstream side of the upper end of the heater core 13 provided, and in this case is, because the heater core is 13 12 disposed inclined opposite the evaporator, the bottom end heater core 13 from the evaporator 12 separate, in order to increase the distance between the evaporator 12 and the bottom end of the heater core 13.

It can in this way even if the condensed flows water in the evaporator 12 in all directions, if air flows, prevented becomes that the condensed water in the evaporator adheres to 12 direct at the heater core 13.

In particular the angle of inclination THETA 1 of the partition plate 15b between the evaporator 12 and the heater core measures 13 33.5 DEG, and measures the angle of inclination THETA 2 of the heater core 13 14 DEG. The other the distance L between the evaporator 12 and the upper end of the heater core measures 13 16.7 mm. In this case prevented can become that the condensed water at the heater core adheres to 13 easy.

Subsequent one becomes a third embodiment of the invention bottom reference on Fig. 3 and 4 described.

Because with the above-described first and second embodiment the partition plate is 15b in such a manner inclined that the upper end of the partition plate 15b with the heater core is 13 connected and the bottom end of the partition plate 15b with the evaporator is 12 connected, moved itself the condensed water, which adheres to 15b at the partition plate, to the side of the evaporator 12 along the inclined partition plate 15b. However the condensed water can induce itself again to the side of the heater core 13 after the movement to the side of the evaporator 12, if air flows.

With the third embodiment, so that the condensed water that itself to the side of the evaporator along the inclined partition plate 15b moved has 12, drips easy downward down, a bent area is 150 in such a manner formed that it itself of the bottom end of the partition plate 15b downward in the direction of the vehicle from above downward and/or. from downside upward extended. In accordance with illustration in Fig. the bent area 150 possesses 4 an inclined surface 151, which is V-shaped formed. That is, the inclined surface 151 of the bent area 150 possesses a central region in the width

direction (D. h. in the direction of the vehicle from left to the right and/or. from right to the left) first and the second air duct 80 and/or. 90, and the central region of the inclined surface 151 is higher as their two ends. Therefore moved itself, if the condensed water, which has itself to the side of the evaporator 12 moved, the V-shaped one inclined surface 151 achieved, the condensed water easy to the two ends of the bent area 150 in the width direction first and the second air duct 80 and/or. 90, so that the condensed water easy drips downward down. Therefore prevented can become that the condensed water back-flows again to the side of the heater core 13, by vertical planning and/or. Positioning of the bent area 150. In this way the condensed water of the two ends of the bent area 150 in the width direction drips down, and withdraws it to the exterior of the air conditioning housing 11 from the drainage connection 11a out, which is in the floor of the air conditioning housing 11 provided.

With the above-described first and second embodiment the drainage connection is 11a downward in the direction of the vehicle from above and/or. from downside upward opened. With the third embodiment however the drainage connection is 11a for instance in the direction of the vehicle from in front to the rear and/or. from in the back forward in accordance with illustration in Fig. 3 opened. The other the doppelflügel floor space flap becomes 26, is 26 provided at which the rotary shaft 26a at the central region of the floor space flap, used with the above-described first and second embodiment. With the third embodiment however a conventional plate-like flap, at which the rotary shaft is 26a at an end the same provided, is 26 used as the floor space flap. Therefore the communication path becomes 23 the production of a connection between first and the second air duct 80 and/or. 90 using the floor space flap 26 opened and sealed, and is with the third embodiment the connecting flap 24 omitted. The other areas of the third embodiment are the same as with the first embodiment.

Subsequent one becomes a fourth preferable embodiment of the invention bottom reference on Fig. 5 and 6 described.

With the fourth embodiment a guide member 152, manufactured from an elastic material, as for example rubber, at the bottom end of the partition plate 15b provided is. The guide member 152 possesses a thickness of about same those the partition plate 15b. The guide member 152 is so formed that it itself to the whole length first and the second air duct 80 and/or. 90 in the width direction (D. h. in the direction of the vehicle from left to the right and/or. from right to the left) extended, and also so formed that it exhibits a variety of holes 153 at the side of the evaporator 12. The condensed water drips by the holes 153 through downward down.

If condensed water, which has itself to the side of the evaporator 12 along the partition plate 15b moved, drips the guide member 152 achieved, the condensed water by the holes 153 of the guide member 152 downward down. Therefore prevented can become that the condensed water flows again to the side of the heater core 13, if air flows. Because the other guide member 152 from an elastic material, as for example rubber, is manufactured, the guide member becomes 152 between the partition plate 15b and the evaporator 12 even easy inserted if the small distance between the partition plate 15b and the evaporator becomes 12 something changed.

The guide member 152 can to a lower END and/or. Front surface of the partition plate 15b using an adhesive or such fixed becomes. The other areas with the fourth embodiment are the same as with the third embodiment.

▲ top Subsequent one becomes a fifth preferable embodiment of the invention bottom reference on Fig. 7 described.

With the fifth embodiment an air conditioning unit 100D possesses an auxiliary electrical heating mechanism 16, which is 13 disposed at that immediate air-downstream side of the heater core. The remainders of the air conditioning unit 100D with the fifth embodiment are the same as with the first embodiment. The auxiliary electrical heating mechanism 16 is in such a manner disposed between the two partition plates 15c and 15d that it both first and the second air duct 80 and/or. 90 crosses. The other the auxiliary electrical heating mechanism is 16 in such a manner disposed that it the whole length both first and the second air duct 80 and 90 in the direction of the vehicle from left to the right and/or. from right to left crosses.

The auxiliary electrical heating mechanism 16 serves a temperature difference of blowing air between the upper side and the lower side for the quick heating of the passenger compartment, if the temperature of the hot water is lower as a predetermined temperature (for example 75 DEG C), as for example at present starting the engine, and serves for the formation. The auxiliary electrical heating mechanism 16 preferably consists of an electrical resistor (PTC heater) with positive resistance temperature characteristics, with which the value of resistor increases with a predetermined temperature sudden. In particular the PTC heater, which is manufactured from a ceramic material, in a honeycomb shape with a variety of pores is formed, so that the auxiliary electrical heating mechanism becomes 16 obtained.

In accordance with illustration in Fig. 7 downward is with the fifth embodiment the auxiliary electrical heating mechanism 16 both in first and in the second air duct 80 and 90 in the direction of the vehicle from above and/or. from downside upward disposed, and is the partition plate 15c at one about central region of the auxiliary electrical heating mechanism 16 in the direction of the vehicle from above downward and/or. from downside upward disposed. That is, each about half surface of the auxiliary electrical heating mechanism 16 is in first and/or. the second air duct 80 and 90 disposed. The arrangement-flat of the auxiliary electrical heating mechanism 16 opposite first and the second air duct 80 and/or. 90 so set can become that a pre-determined temperature difference between the air, which become of the first air duct 80 from blown and the air adjusts itself, which become of the second air duct 90 from blown. For example a large area of the auxiliary electrical heating mechanism is 16 in the first air duct 80 disposed, so that air, which becomes of the first air duct 80 from blown, exhibits a temperature high as those the air, which becomes of the second air duct 90 from blown.

The operation of the auxiliary electrical heating mechanism 16 with each air discharge opening mode becomes subsequent described. The other operations with each discharge opening mode are the same as with the first embodiment, and on their explanation is does without here.

With the floor space Luftauslass-mode will, if the temperature of the hot water circulating in the heater core 13 is lower as a predetermined temperature, electric power of the auxiliary electrical heating mechanism 16 supplied becomes, so that the auxiliary electrical heating mechanism 16 air heated, those by first and the second air duct 80 and/or. 90 passes through. Therefore, if the temperature of the hot water circulating in the heater core is lower as a predetermined temperature, prevented can become that the heating ability for the passenger compartment and defrosting for the windshield become reduced. The heat production quantity of the auxiliary electrical heating mechanism 16 can become the corresponding temperature of the hot water changed circulating in the heater core 14. If a large area of the auxiliary electrical heating mechanism is 16 in the first air duct 80 disposed, can a temperature difference between the air, which becomes of the floor space opening portion 25 from blown, and the air achieved become, which becomes of the Defroster opening portion 19 from blown.

With floor space/Defroster air outletmode the auxiliary electrical heating mechanism 16 possesses an effect same those with the floor space Luftauslass-mode. As is the case for the first embodiment the heater core 13 is such with a current in a single direction. That is, in the heater core 13 the hot water flows in a single direction of the side of the first air duct out of to the side of the second air duct 90, and becomes the temperature of the hot water at the side of the hot water outlet low as that at the side of the hot water inlet of the same. Thus the temperature of the air, which becomes of the Defroster opening portion 19 from blown, becomes lower, so that the problem can occur that defrosting for the windshield insufficiently. In this case will the attach-flat of the auxiliary electrical heating mechanism 16 in the second air duct 90 compared with the attach-flat of the auxiliary electrical heating mechanism 16 into the first air duct 90 enlarged, in order to increase the temperature of the air, which becomes 19 blown of the second air duct 90 out toward to the Defroster opening portion. Thus defrosting the windshield can be improved in prefered manner.

On the other hand, if the attach-flat of the auxiliary electrical heating mechanism becomes 16 80 than 90 made large in the first air duct in the second air duct, the temperature of the air, which becomes of the floor space opening portion 25 from blown, can become sufficient high made than that the air, which becomes of the Defroster opening portion 19 from blown. In this way the heating ability for the passenger compartment can be improved in prefered manner.

Because the second container 13b with the hot water outlet of the heater core is 13 90 disposed in the second air duct and the first container 13a with the hot water inlet of the heater core is 13 in the first air duct 80 disposed, can the temperature difference between the air, which becomes of the floor space opening portion 25 from blown, and the air set become, which becomes of the Defroster opening portion 19 from blown.

With the Defroster air outletmode the auxiliary electrical heating mechanism can become 16 as an auxiliary electrical source used.

With the head room air discharge opening mode the auxiliary electrical heating mechanism 16 is generally switched off.

▲ top

With the Bi-level-air outlet-mode hot water flows in a single direction of the side of the first air duct 80 to the side of the second air duct 90, and becomes the temperature of the hot water at the side of the hot water outlet low as at the side of the hot water inlet. Therefore even then, if the mode for exclusive outside air or the mode for exclusive interior air is set, the temperature by the second air duct 90 through of the flowing air low becomes as that the air, which flows through the first air duct 80. That is, the temperature of the air, which becomes toward to that head space opening portions 21 blown, becomes low as that the air, which becomes 25 blown toward to the floor space opening portion. Thus the temperature distribution for the "cool of the head portion and the heating of the floor area" can become in the passenger compartment achieved with the Bi-level-air outlet-mode. The other can with the fifth embodiment, because the auxiliary electrical heating mechanism 16 in first and the second air duct 80 and/or. 90 provided is, the temperature distribution for the "cool of the head portion and the heating of the floor area" easy set becomes.

With the fifth embodiment the partition plate 15b is so inclined in same way as with the first embodiment that the upper end of the partition plate 15b with the heater core 13 is located in connection and the bottom end of the partition plate 15b with the evaporator 12 is located in connection. In this way the condensed water at the core region adheres to 13c of the heater core 13 not, and can become prevented that the humidity in the passenger compartment rises and the Defrosten and clear making affected and/or. degraded become.

With the fifth embodiment the auxiliary electrical heating mechanism can become 16 automatic regulated. Alternate one can be an adjustment element for manual adjusting of the heat production quantity of the auxiliary electrical heating mechanism 16 at the air conditioning operation board provided, so that the heat production quantity of the auxiliary electrical heating mechanism 16 and "" - and "OUT" - the state of the auxiliary electrical heating mechanism 16 manual by a passenger in the passenger compartment set to become to be able.

Subsequent one becomes a sixth preferable embodiment of the invention bottom reference on Fig. 8 and 9 described.

With the above-described fifth embodiment the auxiliary electrical heating mechanism is 16 both in first and in the second air duct 80 and/or. 90 disposed, and is the partition plate 15c at one about middle region of the auxiliary electrical heating

mechanism 16 in the direction vehicle from above downward and/or. from downside upward disposed. With the sixth embodiment however the auxiliary electrical heating mechanism is 16 only in the first air duct 80 at the side of the first container 13a of the heater core 13 disposed. The auxiliary electrical heating mechanism 16 is 13 disposed at that immediate air-downstream side of the heater core, over the overall length of the first air duct 80 in the direction of the vehicle from left to the right and/or. from right to left (D. h. to cross in the width direction). The other areas of the sixth embodiment are the same as with the fifth embodiment.

The other the heater core is 13 so disposed with the sixth embodiment in same way as with the first embodiment that it crosses the total area of the second air duct 90 and crosses a part of the first air duct 80, in order to train the cooling air bypass passage 17 in the first air duct 80 at the bottom portion of the heater core 13. In accordance with illustration in Fig. the heater core 13 exhibits 9 the first container 13a with the hot water inlet, the second container 13b with the hot water outlet and the heater core 13d. Heater core 13d is laminated heater core, is laminated with which a variety of flat tubes 13d, which are ever formed by mutual connecting of two thin sheet metals, manufactured from aluminium or such a thing, in order to arrange a corrugated fin 13e between adjacent flat tubes sand yield-like, and then integral and/or. soldered with one another is. In the heater core 13 is an air duct formed. The air duct in the heater core 13 is so divided on the extension lines of the partition plates 15b and 15c by means of a ribbed surface of the corrugated fins 13e or a flat surface of the flat tubes 13d that the first air duct 80 and the second air duct are 90 in the heater core 13 likewise from each other separate.

With the sixth embodiment the hot water inlet at the first container is 13a provided, which is in the first air duct 80 disposed, and is the hot water outlet at the second container 13b provided, which is in the second air duct 90 disposed. In the heater core 13 it flows into the second container 13b from the first container 13a out of introduced hot water by the flat tubes 13d of the core region 13c of the lower side of the same to the upper side of the same, and flows in. That is, with the sixth embodiment the heater core 13 is such a exclusive with a current in a single direction, in which from the hot water inlet of the first container 13a introduced hot water in a single direction from the lower sides to the upper sides of all flat tubes 13d flows.

In same way as with the first embodiment a hot water valve 14 is 14 set for adjusting the flow amount and the temperature of the hot water provided inflowing into the heater core 13, and becomes the temperature of the air which can be injected into the passenger compartment by means of the hot water valve. That is, with the sixth embodiment the hot water valve 14 is a temperature setting unit for adjusting the temperature of the air, which is to be injected into the passenger compartment.

The auxiliary electrical heating mechanism 16 is in the first air duct 80 at an immediate air-downstream side of the heater core 13 in accordance with illustration in Fig. 8 disposed. That is, the auxiliary electrical heating mechanism 16 is 13 disposed at the side of the hot water inlet of the heater core. If the temperature of the hot water circulating in the heater core 13 is lower as a predetermined temperature (for example 75 DEG C), electric power of the auxiliary electrical heating mechanism becomes 16 supplied, in order to warm up to air, which is to be injected into the passenger compartment, quick.

▲ top

With the floor space Luftauslass-mode will, if the temperature of the hot water circulating in the heater core 13 is lower as a predetermined temperature (for example 75 DEG C), electric power of the auxiliary electrical heating mechanism 16 supplied becomes, so that the auxiliary electrical heating mechanism 16 air, which passes through the first air duct 80, heated. Therefore even then, if the temperature of the hot water circulating in the heater core 13 is lower as a predetermined temperature, prevented can become that the heating ability for the passenger compartment becomes reduced. The heat production quantity of the auxiliary electrical heating mechanism 16 can become the corresponding temperature of the hot water changed circulating in the heater core 13.

With the sixth embodiment the hot water inlet of the heater core is 13 in the first air duct provided, and is the auxiliary electrical heating mechanism 16 likewise in the first air duct 80 provided. Therefore the temperature of the air, which becomes of that floor space opening portions 25 from blown, becomes in prefered manner increased in relation to the temperature of the air, which becomes of the Defroster opening portion 19 from blown. Because the other heater core 13 is such a exclusive with a current in a single direction, the temperature of the hot water at the side of the hot water inlet is high as that at the side of the hot water outlet. With the sixth embodiment, because the hot water inlet of the hot water core is 13 80 disposed in the first air duct and the auxiliary electrical heating mechanism is likewise 16 in the first air duct 80 disposed, the temperature of the air, which becomes from the floor space opening portion from blown, is significant increased. The other interior air/outside air alternating current mode is set with the maximum heating operation, so that interior air with a temperature high flows as the temperature of the outside air in the first air duct 80 and outside air flows in the second air duct 90. In this way the temperature from the floor space opening portion of the 25 from blown air is compared with the temperature from the Defroster opening portion 19 from blown air of the greatly increased, in order to increase the heating ability for the passenger compartment.

With the floor space/Defroster air outletmode possesses the auxiliary electrical heating mechanism 16 an effect similar those with the floor space Luftauslass-mode. That is, the temperature of the floor space opening portion from blown air is in prefered manner increased.

With the sixth embodiment the partition plate 15b is so inclined in same way as with the first embodiment that the upper end of the partition plate 15b with the heater core is 13 connected and the bottom end of the partition plate 15b with the evaporator is 12 connected. In this way the condensed water at the heater core adheres to 13c of the heater core 13 not, and can become prevented that the humidity in the passenger compartment rises and defrosting and clear making affected

and/or. degraded become.

Subsequent one becomes a sieved preferable embodiment of the invention bottom reference on Fig. 10 described.

With the above-described sixth embodiment the first container 13a with the hot water inlet of the heater core is 13 in the first air duct 80 disposed and is the auxiliary electrical heating mechanism 16 likewise in the first air duct 80 disposed. With the sieved embodiment however the first container 13a with the hot water inlet of the heater core is 13 in the second air duct 90 disposed, and is the second container 13b with the hot water outlet in the first air duct disposed. In same way as with the sixth embodiment the heater core 13 is an heater core with a current in a single direction, in the hot water of the first container 13a out by the flat tubes 13d of the core region 13c from the upper side to the lower side of the core region 13c flows. The other the auxiliary electrical heating mechanism 16 is in the second air duct at that immediate air-downstream side of the heater core 13 disposed with the sieved embodiment.

With the floor space Luftauslass-mode or the floor space/Defroster air outletmode, if the hot water valve becomes 14 adjusting the maximum heating of state fully opened, interior air/outside air alternating current mode set becomes. In this case, if the temperature of the hot water is low and the temperature of the outside air is likewise low, the temperature of the air, which becomes of the Defroster opening portion 19 from blown, can become strong lowered. With the sixth embodiment will, because the hot water inlet of the heater core 13a in the second air duct is 90 disposed and the auxiliary electrical heating mechanism is likewise 16 in the second air duct 90 disposed, the outside air in the second air duct 90 by means of the heater core 13 at the side of the hot water inlet heated, and can this air by means of the auxiliary electrical heating mechanism 16 heated become. Thus the temperature of the air, which becomes of the Defroster opening portion 19 from blown, will become increased, in order to prevent in such a way that the warm feeling of a passenger in the passenger compartment and the snow and ice removal ability for the windshield become affected.

Subsequent one becomes a respected preferable embodiment of the invention bottom reference on Fig. 11 described.

In the air conditioning unit 100G of the respected embodiment is in accordance with illustration in Fig. 11 the heater core 13 in such a manner disposed that the first container 13a on the side of the hot water inlet in the second air duct is 90 high 80 disposed as the first air duct and that the second container 13b on the side of the hot water outlet is in the first air duct 80 disposed. The heater core 13 is an heater core with a current in a single direction, in the hot water of the first container 13a out by the flat tubes 13d of the heater core 13c of the upper side toward to the lower side of the core region 13c flows.

At that immediate air-downstream side of the heater core 13 in the first air duct 80 is the auxiliary electrical heating mechanism 16 in such a manner disposed that it the overall length of the first air duct in the direction of the vehicle from left to the right and/or. from right to left crosses.

With the floor space Luftauslass-mode and the Defroster air outletmode becomes, if the temperature of the hot water circulating in the heater core 13 is lower as a predetermined temperature (for example 75 DEG C) with the maximum heating state, with which the hot water valve 14 fully closed is, electric power of the auxiliary electrical heating mechanism
▲ top 16 supplied, in order to warm up the air in the first air duct 80. In this way even then, if the hot water exhibits low temperature, prevented can become that the heating ability for the passenger compartment is insufficient. The other the hot water inlet of the heater core is 13 in the second air duct 90 disposed, and is the hot water outlet of the heater core 13 in the first air duct 80 disposed with the respected embodiment. In this way can a suitable temperature difference between the air, which becomes of the floor space opening portion 25 from blown, and the air set become, which becomes of the Defroster opening portion 19 from blown.

Because the heater core 13 is an heater core with a current in an exclusive single direction, the temperature of the hot water on the side of the hot water outlet is low as that on the side of the hot water inlet. With the respected embodiment the hot water outlet of the heater core is 13 in the second air duct 90 disposed, and is the auxiliary electrical heating mechanism 16 in the second air duct 90 disposed, in order to increase the temperature of the air, which becomes of the Defroster opening portion 19 from blown. In this way the air, which becomes of the heater core 13 from blown, possesses an uniform temperature distribution. In the comparison with the case, is 13 disposed with which the auxiliary electrical heating mechanism 16 at the side of the hot water inlet of the heater core, can the temperature difference between the air, which becomes of the floor space opening portion 25 from blown, and which becomes air, which becomes of the Defroster opening portion 19 from blown, small made, so that a suitable temperature distribution of blowing air set can become.

In this way will the temperature of the air, which becomes of the Defroster opening portion 19 from blown, not strong lowered, in order to prevent in such a way that the warm feeling of a passenger in the passenger compartment and the snow and ice removal ability for the windshield affected and/or. degraded become. The other operations with the respected embodiment are the same as with the first embodiment.

The quantities of heat of the auxiliary electrical heating mechanism 16 the corresponding temperature of the hot water automatic set circulating in the heater core 13 can become.

Subsequent one becomes a ninth preferable embodiment of the invention bottom reference on Fig. 12 described.

In accordance with illustration in Fig. 12 is with the air conditioning unit 100H of the ninth embodiment the heater core 13 in such a manner disposed that the first container 13a on the side of the hot water inlet in the first air duct is 80 disposed and that the second container 13b on the side of the hot water outlet is in the second air duct 80 disposed above the first air duct. The heater core 13 is an heater core with a current in a single direction, in the hot water of the first container 13a out by the flat tubes 13d of the core region 13c of the lower side toward to the upper side of the core region 13c flows. The other the auxiliary electrical heating mechanism 16 is in the second air duct 90 at that immediate air-downstream side of the heater core 13 disposed. That is, the auxiliary electrical heating mechanism 16 is 13 disposed at the side of the hot water outlet of the heater core.

Because is 13 disposed with the ninth embodiment of the invention the auxiliary electrical heating mechanism 16 on the side of the hot water outlet of the heater core, the temperature of the air, which becomes 90 blown of the heater core 13 out in the second air duct, can by which warm one increased become, which becomes 16 generated in the auxiliary electrical heating mechanism. Thus the temperature difference between the air in same way as with the respected embodiment, which becomes from the floor space opening portion from blown, can, and which becomes air, which becomes of the Defroster opening portion 19 from blown, small made, so that a suitable temperature difference set can become.

The other the first container 13a with the hot water inlet is in the first air duct 80 disposed, and is the second container 13b with the hot water outlet in the second air duct 90 disposed, can the temperature of the made high of the first air duct 80 from blown air become as that from the second air duct of the 90 from blown air with the ninth embodiment, if the mode for exclusive outside air or the mode for exclusive interior air becomes set, after the temperature of the hot water on a predetermined temperature increased is and the auxiliary electrical heating mechanism is stopped. In this way can with the floor space air discharge opening mode and the floor space/Defroster air outletmode the temperature of the made high of the floor space opening portion 25 from blown air become as that by the Defroster opening portion of the 19 from blown air, and can the temperature distribution for the "cool of the head portion and the heating of the floor area" set become.

With the Bi-level-air outlet-mode can, because the temperature of the made high of the floor space opening portion 25 from blown air can become as that of the head space opening portion of the 21 from blown air, the temperature distribution for the "cool of the head portion and the heating of the floor area" set become.

Although the invention in connection with preferable embodiments bottom reference on the accompanying designs complete described is, it is to be noted that numerous changes and modifications for the expert will be knowable.

For example the Defroster opening portion is 19 with the Bi-level-air outlet-mode closed with the above-described embodiment. However the Defroster opening portion can be 19 with the Bi-level-air outlet-mode somewhat opened. That is, the ratio between the amount of the head space opening portion of the 21 from blown air, the amount of the floor space opening portion of the 25 from blown air and the amount of the Defroster opening portion of the 19 from blown air can be on 45/40/15 set. In this case air becomes concurrent of everyone of the opening portions 21, 25 and 19 blown.

top

With each above-described embodiment becomes the auxiliary electrical heating mechanism 16 the corresponding temperature of the hot water automatic regulated circulating in the heater core 13. However an adjustment element can be for manual adjusting of the heat production quantity of the auxiliary electrical heating mechanism 16 at the air conditioning actuation board provided, so that the heat production quantity of the auxiliary electrical heating mechanism 16 and "" - and "OUT" - the state of the auxiliary electrical heating mechanism 16 manual on the part of a passenger in the passenger compartment set to become to be able. Therefore the temperature difference between the upper side and the lower side in the passenger compartment can on the part of the passenger in the passenger compartment regulated become, and can the temperatures at the upper side and at the lower side in the passenger compartment independent regulated become.

The other the invention can find with an air conditioner with an exclusive manual operation application, with which the opening degree of the hot water valve 14 and such exclusive manual by the passenger in the passenger compartment operated to become to be able. In this case the auxiliary electrical heating mechanism can become 16 automatic regulated.

With each above-described fifth - the air conditioner interior air/outside air alternating current mode can adjust ninth embodiment, so that the air duct in the air conditioning housing by means of the partition plates 15a, 15b and 15c into the first air duct 8 and 80, by which through interior air flows toward to the floor space opening portion 25, and 90 divided into which second air duct 9 and becomes, by which through outside air flows toward to the Defroster opening portion 19. However the invention can find with a general air conditioner application, with which interior air/outside air alternating current mode cannot become set. That is, with the general air conditioner the first air duct 8 and 80 and the second air duct is 9 and 90 not divided. With the general air conditioner the heater core 13 of a current in a single direction use makes, and is the auxiliary electrical heating mechanism 16 at the side of the hot water outlet on the air-downstream side of the heater core 16 disposed.

Such changes and modifications are to be understood as within the scope of the invention located, how is these defined by the accompanying claims.

Europäisches Patentamt
European Patent Office
Office européen des brevets

Claims of DE19823061	Print	Copy	Contact Us	Close

Result Page

1. Air conditioner for a vehicle with a passenger compartment, comprising:
an air conditioning housing (11) to the formation of an air duct, whereby the air conditioning housing (11) exhibits a floor space opening portion (25) to bubbles of air in the direction of the bottom portion of the passenger compartment and an Defroster opening portion (19) to bubbles of air in the direction of the inner surface of the windshield;
cool purposes a serving heat exchanger (12), which in the air conditioning housing (11) disposed is, to the cool one from there passing through air;
heating purposes a serving heat exchanger (13), which in the air conditioning housing (11) at the air-downstream side cool purposes of the serving heat exchanger (12) disposed is, to the heating of the air passing through there;
a partition element (15a, 15b, 15c) to the splitting of the air duct into a first air duct (8, 80), by which through interior air flows, and into a second air duct (9, 90), by which through outside air flows, this during an alternating current mode, opened with which the floor space opening portion (25) and the Defroster opening portion (19) are in such manner that the first air duct (8, 80) with the floor space opening portion (25) is located in connection and the second air duct (9, 90) with the Defroster opening portion (19) is located in connection, whereby the partition element (15a, 15b, 15c) is so disposedthat the first air duct (8, 80) at a location is deep disposed as the second air duct (9, 90) in the vehicle, how:
the partition element (15a, 15b, 15c) a partition plate (15b) with a first end, which are connected with that cool purposes serving heat exchanger (12), and a second end exhibits, which are connected with that heating purposes serving heat exchanger (13); and
the partition plate (15b) oblique heat exchanger (12) and that serving between that cool purposes heating purposes serving heat exchanger (13) in such a manner disposed is that the first end of the partition plate (15b) is in the comparison with the second end of the partition plate (15b) at a deeper location disposed.

2. Air conditioner according to claim 1, whereby heating purposes serving heat exchangers (13) so disposed is that it is at the upper side of the vehicle in relation to the cool purposes serving heat exchanger (12) shifted, in order to form a cooling air bypass passage (17) at the lower side heating purposes of the serving heat exchanger, by which cooling air bypass passage (17) air through, which passed through the cool purposes serving heat exchanger (12), the heating purposes serving heat exchanger (13) in the bypass goes around.

▲ top

3. Air conditioner after any of the claims 1 and 2, whereby heating purposes serving heat exchangers (13) opposite that cool purposes serving heat exchanger (13) in such manner oblique disposed is that the bottom end heating purposes of the serving heat exchanger (13) of that is cool purposes serving heat exchanger (12) in the comparison with the upper end heating purposes of the serving heat exchanger (13) separate.

4. Air conditioner according to claim 3, whereby the Defroster opening portion (19) at that is immediate air-downstream side of the upper end heating purposes of the serving heat exchanger (13) provided.

5. Air conditioner after any of the claims 1 to 4, how:
the first end of the partition plate (15b) with that cool purposes serving heat exchanger (12) at the central region of the same in the direction of the vehicle from above downward and/or. from downside upward connected is; and
the second end of the partition plate (15b) with that heating purposes serving heat exchanger (13) at the central region of the same in the direction of the vehicle from above downward and/or. from downside upward connected is.

6. Air conditioner after any of the claims 1 to 5, how:
the first end of the partition plate (15b) a V-shaped surface (151) with one central region and two ends in the width direction first and the second air duct (80, 90) exhibits, whereby the central region of the surface (151) is high as the two ends the same in the width direction.

7. Air conditioner after any of the claims 1 to 5, how:
the first end of the partition plate (15b) a guide member (152) to the Nachuntenherunterführen of condensed water exhibits; and
the guide member (152) a variety of holes (153) to the Heruntertropfen of the condensed water exhibits.

8. Air conditioner according to claim 7, whereby the guide member (152) from an elastic material is manufactured.

9. Air conditioner according to claim 1, other comprising:
an auxiliary heater unit (16), which at the air-downstream side heating purposes of the serving heat exchanger (13) disposed is, to the heating of by the air duct of passing through air.

10. Air conditioner according to claim 9, how:
heating purposes serving heat exchangers (13) so disposed it is that he crosses both first and the second air duct (80, 90), in order to warm up air passing through there using there flowing hot water; and the auxiliary heater unit (16) in such a manner disposed is to be warmed up that it crosses both first and the second air duct (80, 90), in order by first and the second air duct (80, 90) passing through air.

11. Air conditioner according to claim 10, how:
the auxiliary heater unit by means of the partition element (15a, 15b, 15c) into a first surface, which is in the first air duct (80) disposed, and into a second surface divided is, which is in the second air duct (90) disposed; and
the auxiliary heater unit (16) in such a manner disposed is that the first surface is large formed as the second surface.

12. Air conditioner according to claim 10, how:
the auxiliary heater unit (16) by means of the partition element (15a, 15b, 15c) into a first surface, which is in the first air duct (80) disposed, and into a second surface divided is, which is in the second air duct (90) disposed; and
the auxiliary heater unit (16) in such a manner disposed is that the first surface is small formed as the second surface.

13. Air conditioner according to claim 9, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90), in order to warm up air passing through there using there flowing hot water;
and the auxiliary heater unit (16) in the first air duct (80) disposed is, in order to warm up by the first air duct (80) passing through air.

14. Air conditioner according to claim 9, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90), in order to warm up air passing through there using there flowing hot water;
and the auxiliary heater unit in the second air duct (90) disposed is, in order to warm up by the second air duct (90) passing through air.

15. Air conditioner after any of the claims 10 to 14, how:
heating purposes serving heat exchangers (13) a first container (13a) with a hot water inlet, by which through hot water of an engine becomes from there introduced, a second container (13b) with a hot water outlet, by that through hot water, which has an heat exchange with air experienced, the engine returned becomes, and a variety of tube (13d) exhibits, which between the first container (13a) and the second container (13b) disposed is, in order the first container (13a) and the second container (13b) to interconnect; and
top heating purposes serving heat exchangers (13) an heat exchanger with a current in a single direction is, in which the hot water of the first container (13a) flows by each tube (13d) in a single direction to the second container (13b).

16. Air conditioner according to claim 15, whereby heating purposes serving heat exchangers (13) in such a manner disposed it is that the first container (13a) is in the first air duct (80) disposed and is the second container (13b) in the second air duct (90) disposed.

17. Air conditioner according to claim 15, whereby heating purposes serving heat exchangers (13) in such a manner disposed it is that the first container (13a) is in the second air duct (90) disposed and is the second container (13b) in the first air duct (80) disposed.

18. Air conditioner after any of the claims 10 to 17, other comprising:
a temperature rule unit (14) to adjusting the flow amount or the temperature of the water inflowing in the heating purposes serving heat exchanger (13), in order to regulate the temperature of the air injected into the passenger compartment.

19. Air conditioner after any of the claims 10 to 18, how:
the auxiliary heater unit (16) electric heater (16) is.

20. Air conditioner according to claim 19, whereby electric power of the electric heater (16) supplied will, in order to produce warm ones, if the temperature that heating purposes serving heat exchanger (13) of the supplied hot water is lower as a predetermined temperature.

21. Air conditioner after any of the claims 1 to 20, other comprising:
an interior air/an outside air switch unit (2, 2a, 3, 4 and 5) adjusting a mode for exclusive interior air, introduced with which only interior air becomes into both first and the second air duct (8, 80, 9, 90), a mode for exclusive outside air, with only the outside air both in the first and into the second air duct (8, 80, 9, 90) introduced becomes, and an alternating

current mode, with interior air into the first air duct (8, 80) introduced and outer into the second air duct (9, 90) introduced becomes ssenluft.

22. Air conditioner for a vehicle with an engine and a passenger compartment, comprising:
an air conditioning housing (11) to the formation of an air duct, whereby the air conditioning housing (11) exhibits a floor space opening portion (25) to bubbles of air in the direction of the bottom portion of the passenger compartment and an Defroster opening portion (19) to bubbles of air in the direction of the inner surface of the windshield;
heating purposes a serving heat exchanger (13), which in the air conditioning housing (11) disposed is, to the heating from there passing through air using from the engine flowing hot water;
a partition element (15a, 15b, 15c) to the splitting of the air duct into a first air duct (8, 80), by which through interior air flows, and into a second air duct (9, 90), by which through outside air flows, this during an alternating current mode, with which the floor space opening portion (25) and the Defroster opening portion (19) are in such manner opened that the first air duct (8, 80) with the floor space opening portion (25) is located in connection and the second air duct (9, 90) with the Defroster opening portion (19) is located in connection, an interior air/an outside air switch unit (2, 2a, 3, 4, 5) for adjusting the alternating current mode, with interior air into the first air duct introduced will and outside air into the second air duct introduced becomes; and
an auxiliary heater unit (16), which at the air-downstream side heating purposes of the serving heat exchanger disposed is, to the heating of by this air duct of passing through air.

23. Air conditioner according to claim 22, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90); and
the auxiliary heater unit (16) in such a manner disposed is to be warmed up that it crosses both first and the second air duct, in order by first and the second air duct (80, 90) passing through air.

24. Air conditioner according to claim 23, how:
the auxiliary heater unit (16) into a first surface, which is in the first air duct (80) disposed, and into a second surface divided is, which is in the second air duct (90) disposed; and
the auxiliary heater unit (16) in such a manner disposed is that the first surface is large made as the second surface.

25. Air conditioner according to claim 23, how:
the auxiliary heater unit into a first surface, which is into the first air duct (80) disposed, and into a second surface divided is, which is in the second air duct (90) disposed; and
the auxiliary heater unit (16) in such a manner disposed is that the first surface is small made as the second surface.

26. Air conditioner according to claim 22, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90);
the auxiliary heater unit (16) in the first air duct (80) disposed is, in order to warm up by the first air duct (80) passing through air.

▲ top
27. Air conditioner according to claim 22, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90), and the auxiliary heater unit (16) in the second air duct (90) disposed is, in order to warm up by the second air duct (90) passing through air.

28. Air conditioner after any of the claims 23 to 27, how:
heating purposes serving heat exchangers (13) a first container (13a) with a hot water inlet, by which through hot water of an engine becomes from there introduced, a second container (13b) with a hot water outlet, by that through hot water, which has an heat exchange with air experienced, the engine returned becomes, and a variety of tube (13d) exhibits, which between the first container (13a) and the second container (13b) disposed is, in order the first container (13a) and the second container (13b) to interconnect; and
heating purposes serving heat exchangers (13) an heat exchanger with a current in a single direction is, in which the hot water of the first container (13a) flows by each tube (13d) in a single direction to the second container (13b).

29. Air conditioner according to claim 28, whereby heating purposes serving heat exchangers (13) in such a manner disposed it is that the first container (13a) is in the first air duct (80) disposed and is the second container (13b) in the second air duct (90) disposed.

30. Air conditioner according to claim 28, whereby heating purposes serving heat exchangers (13) in such a manner disposed it is that the first container (13a) is in the second air duct (90) disposed and is the second container (13b) in the first air duct (80) disposed.

31. Air conditioner after any of the claims 22 to 30, other comprising:
a temperature rule unit (14) to adjusting the flow amount or the temperature of the water inflowing in the heating purposes serving heat exchanger (13), in order to regulate the temperature of the air injected into the passenger compartment.

32. Air conditioner after any of the claims 22 to 31, how:
the auxiliary heater unit (16) electric heater (16) is.

33. Air conditioner according to claim 32, whereby electric power of the electric heater (16) supplied will, in order to produce warm ones, if the temperature that heating purposes serving heat exchanger (13) of the supplied hot water is lower as a predetermined temperature.

34. Air conditioner for a vehicle with a passenger compartment, comprising:
an air conditioning housing (11) to the formation of an air duct, whereby the air conditioning housing (11) exhibits a floor space opening portion (25) to bubbles of air in the direction of the bottom portion of the passenger compartment and an Defroster opening portion (19) to bubbles of air in the direction of the inner surface of the windshield;
heating purposes a serving heat exchanger (13), which in the air conditioning housing (11) disposed is to heating there passing through air using there flowing hot water, whereby heating purposes serving heat exchangers (13) a first container (13a) with a hot water inlet, becomes introduced through by which hot water there, a second container (13b) with a hot water outlet, returned by which through hot water, which has an heat exchange with air experienced, becomes the exterior, and a variety of tube (13d) for connecting the first container (13a) and the second container (13b) it exhibits; and
an auxiliary heater unit (16), which at the air-downstream side heating purposes of the serving heat exchanger (13) disposed is, to warming air up the passing through the air duct, how:
heating purposes serving heat exchangers (13) an heat exchanger with a current in a single direction is, in which the hot water of the first container (13a) flows by each tube (13d) through in a single direction to the second container (13b); and the auxiliary heater unit (16) at a location in the vicinity of the first container (13a) with the hot water inlet disposed is.

35. Air conditioner for a vehicle with a passenger compartment, comprising:
an air conditioning housing (11) to the formation of an air duct, whereby the air conditioning housing (11) exhibits a floor space opening portion (25) to bubbles of air in the direction of the bottom portion of the passenger compartment and an Defroster opening portion (19) to bubbles of air in the direction of the inner surface of the windshield;
heating purposes a serving heat exchanger (13), which in the air conditioning housing (11) disposed is to heating there passing through air using there flowing hot water, whereby heating purposes serving heat exchangers (13) a first container (13a) with a hot water inlet, becomes introduced through by which hot water there, a second container (13b) with a hot water outlet, returned by which through hot water, which has an heat exchange with air experienced, becomes the exterior, and a variety of tube (13d) for connecting the first container (13a) and the second container (13b) it exhibits; and
an auxiliary heater unit (16), which at the air-downstream side heating purposes of the serving heat exchanger (13) disposed is, to warming air up the passing through the air duct, how:
heating purposes serving heat exchangers (13) an heat exchanger with a current in a single direction is, in which the hot water of the first container (13a) flows by each tube (13d) through in a single direction to the second container (13b); and the auxiliary heater unit (16) at a location in the vicinity of the second container (13b) with the hot water outlet disposed is.

36. Air conditioner after any of the claims 34 and 35, how:
the floor space opening portion (25) in the air conditioning housing (11) at the lower side of the vehicle disposed is;
▲ top the Defroster opening portion (19) in the air conditioning housing (11) at the upper side high as the floor space opening portion (25) provided is; and heating purposes serving heat exchangers (13) in such a manner disposed it is that the first container (13a) with the hot water inlet at the lower side of the vehicle is disposed and the second container (13b) with the hot water outlet at the upper side of the vehicle is disposed.

37. Air conditioner after any of the claims 34 and 35, how:
the floor space opening portion (25) in the air conditioning housing (11) at the lower side of the vehicle disposed is;
the Defroster opening portion (19) at the upper side high as the floor space opening portion (25) provided is; and
heating purposes serving heat exchangers (13) in such a manner disposed it is that the first container (13a) with the hot water inlet at the upper side of the vehicle is disposed and the second container (13b) with the hot water outlet at the lower side of the vehicle is disposed.

38. Air conditioner after any of the claims 34 and 35, other comprising:
an interior air/an outside air switch unit (2, 2a, 3, 4, 5) adjusting an alternating current mode, with interior air within the passenger compartment and outside air outside of the passenger compartment concurrent into the air conditioning housing (11) introduced becomes; and
a partition element (15a, 15b, 15c) to the splitting of the air duct into a first air duct (8, 80), by which through interior air flows, and into a second air duct (9, 90), by which through outside air flows, this during the alternating current mode, are in such a manner opened with which the floor space opening portion (25) and the Defroster opening portion (19) that the first air duct (8, 80) with the floor space opening portion (25) is located in connection and the second air duct (9, 90) with the Defroster opening portion (19) is located in connection.

39. Air conditioner according to claim 38, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90) in such a manner that the first container (13a) with the hot water inlet is in the first air duct (80) disposed and is the second container (13b) with the hot water outlet in the second air duct (90) disposed; and
the auxiliary heater unit (16) in the first air duct (80) disposed is.

40. Air conditioner according to claim 38, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90) in such a manner that the first container (13a) with the hot water inlet is in the second air duct (90) disposed and is the second container (13b) with the hot water outlet in the first air duct (80) disposed; and
the auxiliary heater unit (16) in the second air duct (90) disposed is.

41. Air conditioner according to claim 38, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90) in such a manner that the first container (13a) with the hot water inlet is in the first air duct (80) disposed and is the second container (13b) with the hot water outlet in the second air duct (90) disposed; and
the auxiliary heater unit (16) in the second air duct (90) disposed is.

42. Air conditioner according to claim 38, how:
heating purposes serving heat exchangers (13) in such a manner disposed it is that he crosses both first and the second air duct (80, 90) in such a manner that the first container (13a) with the hot water inlet is in the second air duct (90) disposed and is the second container (13b) with the hot water outlet in the first air duct (80) disposed; and
the auxiliary heater unit in the first air duct disposed is.

43. Air conditioner after any of the claims 34 to 42, other comprising: a temperature rule unit (14) to adjusting the flow amount or the temperature of the hot water inflowing in the heating purposes serving heat exchangers, in order to regulate the temperature of the air injected into the passenger compartment.

44. Air conditioner after any of the claims 34 to 43, how:
the auxiliary heater unit (16) an electric heater (16) is.

45. Air conditioner according to claim 44, whereby electric power of the electric heater supplied will, in order to produce warm ones, if the temperature that heating purposes of the serving heat exchanger of supplied hot water is lower as a predetermined temperature.

▲ top